
Requirements Specification

for

New Gambling Device Submission and Modification

Montana Department of Justice – Gambling Control Division

**April 9, 2015
Version 1.7**



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Revision History

Date	Version	Reason For Changes
4/9/15	1.7	Modified REQ-VGM-GEN-07, REQ-VGM-VAL-01, REQ-VGM-VAL-02, REQ-VGM-SAS-12, and added REQ-VGM-VAL-02.2, REQ-VGM-VAL-04, REQ-LIVE-VAL-02.2, REQ-LIVE-VAL-04. Clarified REQ-VGM-PLAYER-02.
2/17/15	1.6	Clarified REQ-VGM-PLAYER-09, REQ-VGM-PROGRESSIVE-10, REQ-VGM-ACCOUNTING-01.
1/21/15	1.5	Added REQ-LIVE-VAL-01, REQ-LIVE-VAL-02, REQ-LIVE-VAL-03, REQ-VGM-SAS-12 and Appendix E. Modified REQ-VGM-PLAYER-10, REQ-VGM-FREEALTER-08, and REQ-VGM-PROGRESSIVE-01, 02, 05, 09, 10 for clarity. Removed REQ-LIVE-GEN-01. Corrected REQ-VGM-ACCOUNTING-01 and Appendix D. Updated REQ-VGM-POKER-08. Modified Appendix C Baud rate.
1/15/14	1.4	Added REQ-VGM-SAS-11, REQ-VGM-SASLONGPOLL-40, REQ-VGM-FREEALTER-08, REQ-VGM-GEN-16, REQ-VGM-ID-03, and REQ-VGM-ACCOUNTING-17. Modified REQ-VGM-VAL-01, REQ-VGM-VAL-02, and REQ-VGM-VAL-03 for requirements on GAT connector. Clarified REQ-VGM-SASEXCEPTION-30, REQ-VGM-ACCOUNTING-02, and REQ-VGM-VAL-03, REQ-VGM-BONUS-02, REQ-VGM-KENO-11, and REQ-VGM-ACCOUNTING-07. Removed REQ-VGM-KENO-09. Modified REQ-VGM-SAS-04 and REQ-VGM-SAS-05 to note that SAS automation tool is available. Modified Appendix A: Glossary to add terms and definitions for Global Bonus and VG MID.
12/11/12	1.3	Clarified REQ-VGM-SASLONGPOLL-38. Added REQ-VGM-VAL-03.
11/30/12	1.2	Modified REQ-VGM-PLAYER-14 for clarity. Modified REQ-VGM-POKER-06 and REQ-VGM-POKER-07 to clarify cards dealt. REQ-VGM-CASHTICKET-01 clarified bar code. Modified REQ-SASEXCEPTION-31 for clarity.
10/26/12	1.1	Modified REQ-VGM-BONUS-02 for clarity. Corrected REQ-VGM-CASHTICKET-01 by adding "title" to the required cash ticket contents. Modified REQ-VGM-VAL-01 to remove requirement that GAT connection be female.
10/09/12	1.0	REQ-VGM-BA-03 added \$100 bill, REQ-VGM-PLAYER-16 removed text, modified REQ-VGM-CASHTICKET-01, REQ-VGM-BONUS-02 clarified winning combination, REQ-VGM-BONUS-05 clarified when to increment GPLD and GWON, REQ-VGM-PROGRESSIVE-01 clarified denomination, REQ-VGM-MULTI-02 clarification on game specific meters, REQ-VGM-SASEXCEPTION-33 clarified exception, REQ-VGM-SAS-03 modified SAS address, REQ-VGM-SASLONGPOLL-21 removed text, REQ-VGM-SASLONGPOLL-22 removed text and Updated Appendix D. Added REQ-VGM-PLAYER-19, REQ-VGM-FREEALTER-06, REQ-VGM-FREEALTER-07, REQ-VGM-ACCOUNTING-16, REQ-VGM-SASLONGPOLL-38, REQ-VGM-SASLONGPOLL-39, REQ-VGM-VAL-01 and REQ-VGM-VAL-02.
09/30/11	-	Modified REQ-VGM-PLAYER-02 to include an additional label, REQ-VGM-PLAYER-15 to clarify game history, REQ-VGM-BONUS-02 to clarify a bonus game, REQ-VGM-ACCOUNTING-01 to clarify when Multi-Game and Progressive Jackpot meters are required to be printed, REQ-VGM-CASHTICKET-01 to include "Ticket Void After 48 hours" on the cashout ticket, REQ-VGM-MULTI-02 to clarify when game specific meters are required, REQ-VGM-PROGRESSIVE-04 removed reference to impact printer and Appendix C: RNG Test, included line game requirements and removed sample program used to gather RNG data. Added REQ-VGM-PLAYER-18, REQ-VGM-GEN15, REQ-VGM-MULTI-05 and 4.27 Video Line Game Requirements.
12/17/10	-	Modify REQ-VGM-SAS-10 for link down condition and hand pays. Add REQ-VGM-

		PLAYER-17. Remove REQ-VGM-FREEALTER-06 (must be able to cash out on free games).
10/22/10	-	Add SAS Requirements. Modify REQ-VGM-LINKPROGRESSIVE-03 and REQ-VGM-LINKPROGRESSIVE-09. Added REQ-VGM-GEN-14.
9/22/10	-	Modified requirements REQ-VGM-PLAYER-10, REQ-VGM-MULTI-02, REQ-VGM-PROGRESSIVE-04, REQ-VGM-ACCOUNTING-01, REQ-VGM-GEN-11, REQ-VGM-LINKPROGRESSIVE-05, REQ-VGM-LINKPROGRESSIVE-06, REQ-VGM-PROGRESSIVE-10.
4/26/10	-	Add requirement REQ-VGM-POKER-11, REQ-VGM-PROGRESSIVE-08, REQ-VGM-PROGRESSIVE-09, REQ-VGM-SAS-03.
2/9/10	-	Change number of progressive logs to print to be five in REQ-VGM-PROGRESSIVE-04.
1/25/10	-	Added static test requirement.
1/19/10	-	Review changes.
1/15/10	-	Review changes and updates.
12/18/09	-	Initial Version.

1. Introduction

1.1 Purpose

The purpose of this document is to define the requirements specifications for new gambling device submission and modification.

1.2 Intended Audience

The intended audience for this requirements specification document is new and existing VGM manufacturers who wish to submit VGM equipment for approval to operate in the State of Montana.

1.3 References

Audit Storage Device Requirements Specification,
Montana SAS Implementation Guidelines, <https://doj.mt.gov/gaming/vgm-tier1-testing/>

Scarne's Encyclopedia of Card Games by John Scarne, copyright 1983

Naval Website for Daylight Savings, http://aa.usno.navy.mil/faq/docs/daylight_time.php

Official Montana Poker Rulebook, 1990 edition.

GAT (Game Authentication Terminal), <http://www.gamingstandards.com>

2. VGM Architecture Guidelines and Best Practices

The purpose of this section is to provide VGM manufacturers with suggested guidelines and best practices to be incorporated into their machine design and architecture. Suggestions in this section are not mandatory requirements but will help to speed up the regulatory approval process, so consideration is the manufacturer's best interest.

- Modularize the source code. Isolate games from their engines and core software. Isolate paytables and customizations from source code so that it can be changed without rebuilding the binaries.
- Simplify and speed up the build process. Faster builds can lead to faster approval times. If OS images remain static and unchanged separate them from the game binaries so they do not have to be rebuilt for every submission.
- Self-validation carries no merit. All VGMs will be externally and independently validated in the field.
- Limit the number of different binary versions for one VGM. Sometimes different versions or paytables are required for marketing purposes but every binary version is a new submission and build.
- Ensure the game media (EPROM, CD, CF, Hard Drive, SSD, etc ...) are easily removable from the front of the machine. Individual wires and harness only add to the burden in the field inspection process. The best solution is a tray that slides into a connector that is easily removed.

3. Electronic Live Keno/Bingo Device

3.1 General Requirements

REQ-LIVE-GEN-02: The live gambling device shall allow access and removal of the game programmable read-only memory easily if applicable.

REQ-LIVE-GEN-03: The live gambling device shall contain a stamped non-removable identification tag affixed to the main part of the cabinet in a readily visible location. The identification tag shall not be engraved, if applicable.

REQ-LIVE-GEN-04: The live gambling device identification tag shall contain the manufacturer, model number, serial number and date of manufacture. The font used on the identification tag shall differentiate between alpha “O” and numeric “0”, if applicable.

REQ-LIVE-GEN-05: The live gambling device’s non-volatile RAM shall maintain current game data for thirty days with no supplied power, if applicable.

3.2 Software Requirements

REQ-LIVE-SW-01: The live gambling device shall randomly draw numbers at the beginning of the game that will remain frozen until the start of the next game.

REQ-LIVE-SW-02: The live gambling device shall display all the numbers that were drawn.

REQ-LIVE-SW-03: The live gambling device shall operate in conformance with the standard rules of Keno/Bingo as applicable.

3.3 Validation

REQ- LIVE-VAL-01: The live gambling device shall incorporate a RS232 DB9 connector implementing the standard pin out as defined by the EIA-232 standard. The connector shall be easily accessible, and shall be identified as “GAT” through clear physical or software labeling. With GAT enabled on the live device, the connector shall be dedicated solely for GAT communication.

REQ- LIVE-VAL-02: The live gambling device shall incorporate GAT (Gaming Authentication Terminal) version 3.5 or later for verifying all program components. A GAT test tool can be provided from the GCD upon request. Refer to the Gaming Standards web site for protocol specifications: gamingstandards.com.

REQ- LIVE-VAL-02.2: GAT shall be available at all times without requiring a Master Reset. Operator menu selection to enable a GAT port is considered to meet this requirement.

REQ- LIVE-VAL-03: The live gambling device shall send the file *ProgramID.xml* in response to the GAT3 request “Get File ProgramID.xml”. *ProgramID.xml* will be of the following form, where XXXXXX is the Program Name of the live gambling device software:

```
<?xml version="1.0"?>
<ProgramID>
  <Value>XXXXXX</Value>
</ProgramID>
```

Refer to GSA GAT Protocol section 4.2.2 for “Special Function: Get File filename.xml”.

REQ-LIVE-VAL-04: The VGM shall complete the GAT authentication process within 10 minutes testing, at a minimum, all critical program components.

4. Video Gambling Machine (VGM)

4.1 General Printer Requirements

REQ-VGM-GENPRINT-01: The VGM shall halt game play and display a “printer error” message if the printer loses power.

REQ-VGM-GENPRINT-02: The printer shall reside in a locked area of the VGM.

REQ-VGM-GENPRINT-03: The VGM shall halt game play and display a “paper out” message if there is insufficient paper to print any ticket.

REQ-VGM-GENPRINT-04: The VGM shall detect access to the cash and logic areas during a printer error and print after the error is corrected.

REQ-VGM-GENPRINT-05: The VGM shall detect printer errors even if the power is cycled.

REQ-VGM-GENPRINT-06: All printed tickets shall be visible to the player upon printing completion.

4.2 Impact Printer Requirements

REQ-VGM-IMPACTPRINT-01: The impact printer shall produce a duplicate copy (audit) of original ticket.

4.3 Thermal Printer Requirements

REQ-VGM-THRMPRINT-01: The VGM shall conform to the latest Requirements Specification for VGM [Audit Storage Device](#) if a thermal printer is supported.

4.4 Device Identification Requirements

REQ-VGM-ID-01: The VGM shall contain a stamped (with a contrasting color from the background) non-removable identification tag affixed to the right side of the cabinet in a readily visible location. The identification tag shall not be engraved.

REQ-VGM-ID-02: The VGM identification tag shall contain the manufacturer, model number, serial number and date of manufacture. The font used on the identification tag shall differentiate between alpha “O” and numeric “0”.

REQ-VGM-ID-03: The VGMID tag shall be in a location approved by GCD TSS.

4.5 Bill Acceptor Requirements

REQ-VGM-BA-01: The VGM bill acceptor shall utilize a stacker to collect accepted bills.

REQ-VGM-BA-02: The VGM bill acceptor shall be disabled when the bill stacker becomes jammed or full and display an error message.

REQ-VGM-BA-03: The VGM bill acceptor shall not accept any bill larger than \$100.

4.6 Cash Area Requirements

REQ-VGM-CASH-01: The VGM coin drop or bill stacker areas shall be locked and separate from logic area.

REQ-VGM-CASH-02: The VGM shall print a "Cash Accessed" audit ticket when either the coin drop or bill stacker area is accessed. The audit ticket generated shall contain the string "Cash Accessed".

4.7 Logic Board Area Requirements

REQ-VGM-LOGIC-01: The VGM's logic board area shall be locked and separate from cash access area.

REQ-VGM-LOGIC-02: The VGM shall print a "Logic Accessed" audit ticket when logic area is accessed. The audit ticket generated shall contain the string "Logic Accessed".

REQ-VGM-LOGIC-03: The VGM shall maintain all data reported on an audit ticket for thirty days with no supplied power.

REQ-VGM-LOGIC-04: The VGM shall have its programmable read-only memory and/or storage media easily removable from the front of the machine. This is required to allow ease in the field inspection process.

REQ-VGM-LOGIC-05: All removable programmable read-only memory and memory storage media shall contain identification of its version clearly labeled on the physical device.

4.8 Player Awareness Requirements

REQ-VGM-PLAYER-01: The VGM shall display player credits as "Credits" if tracking in credits.

REQ-VGM-PLAYER-02: The VGM shall display player balance as "Balance", "Bank" or "\$" if tracking monetary value.

REQ-VGM-PLAYER-03: The VGM shall display player bet as "Bet" if tracking in credits or monetary value.

REQ-VGM-PLAYER-04: The VGM shall display win award as "Win" or "Won" if tracking in credits or monetary value.

REQ-VGM-PLAYER-05: The VGM screen or cabinet shall display the auto cash out trigger amount if supported.

REQ-VGM-PLAYER-06: The VGM cabinet shall display all accepted denominations.

REQ-VGM-PLAYER-07: The VGM cabinet or screen shall display the string “Malfunction Voids All Plays and Pays” at all times.

REQ-VGM-PLAYER-08: The VGM’s button lights shall coordinate with functions that are enabled or disabled at a particular time.

REQ-VGM-PLAYER-09: The VGM shall not automatically initiate game play while changing or setting bet value.

REQ-VGM-PLAYER-10: The VGM shall reset the bet for a game by any of the following methods: reducing the bet to \$0.25 or less, reducing the bet to the minimum possible bet for that game, or requiring the player to place a bet before start of a new game. Bet reset shall occur when player credits reach zero and 3 minutes has elapsed or whenever attract mode is activated.

REQ-VGM-PLAYER-11: The VGM shall display the string “No one under 18 years of age allowed to play” at all times.

REQ-VGM-PLAYER-12: The VGM shall display the game base paytables without any wager of money.

REQ-VGM-PLAYER-13: The VGM shall display the total number of games played if a cumulative award total is displayed for a series of games.

REQ-VGM-PLAYER-14: The VGM shall display to the player that the maximum award (\$800) has been achieved whenever an award is capped at \$800.

REQ-VGM-PLAYER-15: The VGM shall retain the last game’s data including win data until a successive game is started regardless of power-cycle, accessing the main menu, or help screen. Win data is not required to be retained when exiting a winning game, entering another game, and then returning to the original winning game.

REQ-VGM-PLAYER-16: The VGM shall support help screens for all enabled games and bonuses that are accessible without any player wager. The help screens shall describe how to play games, as well as define all bonus or altered play pay and odd information that is not visible from the main game.

REQ-VGM-PLAYER-17: The VGM shall display any banked or pending bonuses to the player.

REQ-VGM-PLAYER-18: When printing a cashout ticket the VGM shall prominently display “Promptly Redeem Your Win Tickets – Tickets Void After 48 hours”.

REQ-VGM-PLAYER-19: Game must pay as advertised.

4.9 Mechanical Meter Requirements

REQ-VGM-MECHMETER-01: The disassembly of the mechanical meters shall result in destruction of the meters.

REQ-VGM- MECHMETER-02: The VGM shall handle mechanical meter disconnect by displaying an error message and halting game play.

REQ-VGM- MECHMETER-03: The mechanical meters shall contain seven digits.

REQ-VGM- MECHMETER-04: The VGM shall contain non-resettable mechanical dollar meters (7 digit minimum) mounted left to right or top to bottom in a locked and readily accessible location and be labeled and in sequential order as follows: IN, PLAYED, WON, PAID.

4.10 General Requirements

REQ-VGM-GEN-01: The VGM's power switches shall all be internal to the cabinet.

REQ-VGM-GEN-02: The VGM's cabinet shall not have external adhesive decals, stickers or notations.

REQ-VGM-GEN-03: The VGM shall not expose players to any physical, electrical or mechanical hazards.

REQ-VGM-GEN-04: The VGM's credit shall not exceed twenty-five cents in value if tracking in credits.

REQ-VGM-GEN-05: The VGM shall initiate game play once only after the start button has been pressed via the cabinet or the touch screen.

REQ-VGM-GEN-06: The VGM's mechanical meters and non-volatile RAM shall retain data when the machine is power cycled quickly and continuously.

REQ-VGM-GEN-07: The VGM shall retain memory for the current game and all configurable data during power down.

REQ-VGM-GEN-08: The VGM's wires and wire harnesses shall be secured without the use of adhesive anchors.

REQ-VGM-GEN-09: The VGM's monitor bezel shall fit properly against the monitor with minimum gap and shall not have flex.

REQ-VGM-GEN-10: The VGM shall not display or contain any graphics or images, in whole or in part, that simulate an illegal gambling device or enterprise.

REQ-VGM-GEN-11: The unused space on all the VGM's conventional read-only memory (non-flash) shall be zero filled.

REQ-VGM- GEN-12: The auto cash out shall not affect game play when triggered.

REQ-VGM-GEN-13: The VGM shall be insusceptible to static discharge on the exterior of the machine with the mechanical and electronic meters being unaffected. The Static Test Procedure is described in Appendix B of this document.

REQ-VGM-GEN-14: If struts are present in the VGM to assist in the opening of doors or hatches with significant weight, the VGM shall also incorporate an independent safety support used to prevent the unwanted closure of the door or hatch in the event of strut failure.

REQ-VGM-GEN-15: Unattended or auto-play is prohibited except for free games initiated by or as a result of a trigger game.

REQ-VGM-GEN-16: A VGM program shall have only one possible binary image for each executable media component.

4.11 Video Poker Game Requirements

REQ-VGM-POKER-01: The video poker game shall have a minimum 80% return. Games containing a progressive shall use the base progressive amounts when computing the minimum return.

REQ-VGM-POKER-02: The video poker game shall have a maximum award of \$800 including any combined award from a bonus game(s).

REQ-VGM-POKER-03: The video poker game shall have a maximum bet of \$2 per game.

REQ-VGM-POKER-04: The video poker game shall identify all wild cards.

REQ-VGM-POKER-05: The video poker game shall use card images that resemble standard playing cards.

REQ-VGM-POKER-06: The video poker game shall deal the first cards in order from the top of the frozen field as generated by the random number generator.

REQ-VGM-POKER-07: The video poker game shall replace discarded cards in order from the frozen field, starting with the next card after the last card used in the initial deal and drawing any additional cards in the order as generated by the random number generator.

REQ-VGM-POKER-08: The video poker games shall only be draw poker, stud poker, or holdem as described in Scarne's Encyclopedia of Card Games (Copyright 1983 by John Scarne, pages 18 through 276) and conform to the rules defined in the Official Montana Poker Rulebook (version 2014).

REQ-VGM-POKER-09: The electronic and mechanical \$\$PL and GPLD meters shall be incremented once the cards are dealt and not after the draw.

REQ-VGM-POKER-10: If auto-hold is supported, the VGM shall re-enable auto-hold any time the cards are returned to their original dealt state.

REQ-VGM-POKER-11: The stand function shall not be available on a losing hand.

4.12 Video Keno Game Requirements

REQ-VGM-KENO-01: The video keno game shall have a minimum 80% return. Games containing a progressive shall use the base progressive amounts when computing the minimum return.

REQ-VGM-KENO-02: The video keno game shall have a maximum award of \$800 including any combined award from a bonus game(s).

REQ-VGM-KENO-03: The video keno game shall have a maximum bet of \$2 per game.

REQ-VGM-KENO-04: The video keno game shall use a fixed playing card with numbers from 1–80.

REQ-VGM-KENO-05: The video keno game shall draw numbers in order from the top of the frozen field generated from the random number generator.

REQ-VGM-KENO-06: The video keno game shall accept bets on a minimum of 2 spots marked and a maximum of 10 spots marked.

REQ-VGM-KENO-07: The video keno game shall draw at least 20 numbers and display them on the playing card.

REQ-VGM-KENO-08: The video keno game shall conform to the game of keno as defined in Montana Code Annotated 23-5-112 and be of a variation approved in Montana Rule 23.16.1304.

REQ-VGM-KENO-10: The video keno game shall display the “Bet” amount, the number of “Spots Marked”, and the number of “Hits”.

REQ-VGM-KENO-11: If multi-card is supported, the video keno game shall clearly convey the number of cards played.

4.13 Video Bingo Game Requirements

REQ-VGM-BINGO-01: The video bingo game shall have a minimum 80% return. Games containing a progressive shall use the base progressive amounts when computing the minimum return.

REQ-VGM-BINGO-02: The video bingo game shall have a maximum award of \$800 including any combined award from a bonus game(s).

REQ-VGM-BINGO-03: The video bingo game shall have a maximum bet of \$2 per game.

REQ-VGM-BINGO-04: The video bingo game shall draw numbers in order from the top of the previously frozen field generated from the random number generator.

REQ-VGM-BINGO-05: The video bingo game shall have 24 numbered spaces and one free spot per card.

REQ-VGM-BINGO-06: The video bingo game shall generate card numbers using the random number generator.

REQ-VGM-BINGO-07: The video bingo game shall not have two cards that are the same.

REQ-VGM-BINGO-08: The video bingo game shall conform to a standard game of bingo as defined in Montana Code Annotated 23-5-112.

REQ-VGM-BINGO-09: The video bingo game shall display all winning cards including those played by the machine.

REQ-VGM-BINGO-10: The video bingo game shall display the “Bet” amount, the number of “Cards Played”, the number of “Spots Marked”, and the number of “Hits”.

4.14 Bonus Game Requirements

REQ-VGM-BONUS-01: A bonus game shall not be of standard type keno, poker, bingo, or line game and not simulate an illegal gambling device or enterprise.

REQ-VGM-BONUS-02: A bonus game shall be triggered by a defined outcome on the base game of video keno, poker, bingo, or line game. The trivial act of “playing a game” with no other defined events occurring is not a defined outcome.

REQ-VGM-BONUS-03: The combined theoretical return of all bonus games shall be less than 50% of the average overall return of that game.

REQ-VGM-BONUS-04: The combined base game and associated bonus awards shall not exceed the base game’s max award (\$800).

REQ-VGM-BONUS-05: The combination of any base game and associated bonus game(s) (if applicable) shall increase the GPLD and GWON (if applicable) electronic meters by one count. If there is no win in the trigger game but there is a win in an associated bonus game, GWON should increment.

REQ-VGM-BONUS-06: The bonus game shall increment the \$\$WN electronic and mechanical meters if a win is achieved.

REQ-VGM-BONUS-07: The bonus game shall be offered at no risk to the player.

REQ-VGM-BONUS-08: The bonus game shall resume properly if interrupted with a power cycle.

REQ-VGM-BONUS-09: The bonus game shall end immediately once the maximum award has been reached and notify the player accordingly. If the bonus game only awards credit then it shall not be played if triggered by the player with a maximum award win.

REQ-VGM-BONUS-10: A bonus game shall only award multipliers applied to the trigger game win, altered play in subsequent games, free games, and credit that can be redeemed for cash.

4.15 Global Bonus Game Requirements

REQ-VGM-GLOBALBONUS-01: A global bonus game shall not be of standard type keno, poker, or bingo and shall not simulate an illegal gambling device or enterprise.

REQ-VGM- GLOBALBONUS-02: A global bonus game shall be triggered by a win on more than one base game of video keno, poker, or bingo and appear to the player as the same global bonus game regardless of the trigger game..

REQ-VGM- GLOBALBONUS-03: The summation of the combined theoretical return of all global bonuses and all combined bonus games in a single game shall be less than 50% of the overall average return of the game every game.

REQ-VGM- GLOBALBONUS-04: The combined base game and associated global bonus awards shall not exceed the base game's max award (\$800).

REQ-VGM- GLOBALBONUS-05: The global bonus game shall not increment the GPLD and GWON electronic meters.

REQ-VGM- GLOBALBONUS-06: The global bonus game shall increment the \$\$WN electronic and mechanical meters if a win is achieved.

REQ-VGM- GLOBALBONUS-07: The global bonus game shall have its own 10 digit cents won meter that is incremented with the global bonus win amount only and be treated as a separate game on the audit ticket and in SAS.

REQ-VGM- GLOBALBONUS-08: The global bonus game shall not be disabled by the operator.

REQ-VGM- GLOBALBONUS-09: The global bonus game shall resume properly if interrupted with a power cycle.

REQ-VGM- GLOBALBONUS-10: The global bonus game shall end immediately once the maximum award has been reached and notify the player accordingly. If the global bonus game only awards credit then it shall not be played if triggered by the player with a maximum award win.

REQ-VGM- GLOBALBONUS-11: A global bonus game shall only award multipliers applied to the trigger game win, altered play in subsequent games, free games, and credit that can be redeemed for cash.

4.16 Free Game or Altered Play Requirements

REQ-VGM-FREEALTER-01: The free game or game with altered play shall be of type video keno, poker, or bingo that is awarded from the base game of the same type.

REQ-VGM-FREEALTER-02: The free game shall not increment \$\$PL electronic and mechanical meters and shall increment \$\$WN electronic and mechanical meters, and GPLD and GWON electronic meters.

REQ-VGM-FREEALTER-03: The game with altered play shall increment the \$\$PL electronic and mechanical meters, \$\$WN electronic and mechanical meters, and GPLD and GWON electronic meters.

REQ-VGM-FREEALTER-04: The free game or game with altered play shall remain when switching between games, denominations, and cash outs, or power cycles.

REQ-VGM-FREEALTER-05: The free game or game with altered play shall not affect awards in the trigger game.

REQ-VGM-FREEALTER-06: Free games that are auto-played must display each game outcome to the player.

REQ-VGM-FREEALTER-07: Free games that are auto-played are allowed to post the accounting data after the last free game has been played. Free games without auto-play must post the accounting at the completion of each game.

REQ-VGM-FREEALTER-08: A dynamic determination of altered play, based on pre-defined probability, can be made after an altered game is initiated and prior to the first draw/spin of that game.

4.17 Random Number Generator Requirements

REQ-VGM-RNG-01: The RNG shall be initialized from a non-deterministic seed.

REQ-VGM-RNG-02: The RNG shall pass the chi-square, runs, serial correlation, and reel to reel tests.

REQ-VGM-RNG-03: The VGM shall implement the communication mechanism described in Appendix C to allow for RNG testing.

4.18 Accounting Requirements

REQ-VGM-ACCOUNTING-01: Audit tickets shall contain the following information in order, with any non-required data occurring after the info below, for tickets of type audit key (manual request), before and after lifetime memory clear, cash access, logic access, and before and after progressive change:

(Name of licensed establishment)

(Name of city, town, or county)

VGMID # (Video Gambling Machine Identification Decal #) (6 digits)

SERIAL # (machine serial number)

TIME (hr:min) (24 hr format) "D" or "S" (depending on Standard or Daylight Time)

DATE (month/day/year)

PROGRAM # (program name) (6 alphanumeric characters)

VIDEO # (video program name and revision if applicable)

SOUND # (sound program name and revision if applicable)

\$\$I2 (total cents in mechanism(s) if applicable) (10 digits) (xxxxxxxx.xx)

\$\$BA (total cents in bill acc. if applicable) (10 digits) (xxxxxxxx.xx)

\$\$IN (\$\$I2 + \$\$BA) (10 digits) (xxxxxxxx.xx)

\$\$PL (total cents played) (10 digits) (xxxxxxxx.xx)

\$\$WN (total cents won) (10 digits) (xxxxxxxx.xx)

\$\$PD (total cents paid) (10 digits) (xxxxxxxx.xx)

GPLD (total games played) (8 digits)

GWON (total games won) (8 digits)

Multi-Game Meters (if applicable, see Section 4.20) (not required on Logic and Cash Access Tickets)

Progressive Jackpot Info (if applicable, see Section 4.21) (not required on Logic and Cash Access Tickets)

REQ-VGM-ACCOUNTING-02: The “*PROGRAM #*” (Program Name) reported on the audit ticket shall be identical to Paytable ID that is reported in SAS which is 6 alphanumeric characters in length.

REQ-VGM-ACCOUNTING-03: All 10 digit electronic meters (\$XXXXXXXX.XX) must be capable of incrementing to a minimum of 32 bit unsigned maximum value (0xFFFFFFFF hex or 42,949,672.95 decimal). For example, if the current value on \$SPL meter is \$42,949,672.95 and \$.05 is played, \$SPL should roll to \$00,000,000.05.

REQ-VGM-ACCOUNTING-04: If period meters are printed on the audit ticket then they shall be labeled with “Period” and the lifetime meters will be labeled with “Lifetime”.

REQ-VGM-ACCOUNTING-05: The VGM shall have the ability to display all electronic meters, including progressive meters, from the operators menu.

REQ-VGM-ACCOUNTING-06: The VGM shall correctly adjust for leap years.

REQ-VGM-ACCOUNTING-07: The VGM shall support a procedure to clear the lifetime electronic memory but must retain the establishment, city, time, date, serial number, VGM ID, SAS Validation Type and SAS address. “Before Lifetime Memory Clear” and “After Lifetime Memory Clear” audit tickets shall be printed when lifetime memory clear operation is successful. The VGM shall prohibit the lifetime electronic memory clear operation if a credit balance is present.

REQ-VGM-ACCOUNTING-08: The VGM shall zero the electronic escrow meters that track cents for mechanical meter indexing when the lifetime memory clear operation is performed.

REQ-VGM-ACCOUNTING-09: The VGM shall support a mechanism to print an audit ticket labeled as “Audit Ticket” through an external key switch or the external keyed operators menu.

REQ-VGM-ACCOUNTING-10: The VGM shall automatically adjust for daylight savings time. A “D” after the time shall denote daylight savings time and an “S” shall denote standard time. Refer to the [Naval website](#) for when daylight savings time begins and ends.

REQ-VGM-ACCOUNTING-11: If the VGM supports a master reset mechanism used to restore corrupted memory or upgrade software it shall be independent of the game software and no audit tickets are required.

REQ-VGM-ACCOUNTING-12: Electronic meters shall balance using the formula:
$$\$IN + \$\$WN - \$\$PL = \$\$PD$$

REQ-VGM-ACCOUNTING-13: If the VGM detects a software upgrade automatically then it shall print an audit ticket with a “New Software” label.

REQ-VGM-ACCOUNTING-14: The VGM shall not allow runtime selection of ASD support.

REQ-VGM-ACCOUNTING-15: The VGM’s clock shall not be affected by any operation and continue to keep accurate time while powered off.

REQ-VGM-ACCOUNTING-16: The VGM shall post any accounting immediately before an event associated with that accounting is reported.

REQ-VGM-ACCOUNTING-17: The VGM shall retain the Date and Time when a RAM Clear occurs.

4.19 Cash Ticket Requirements

REQ-VGM-CASHTICKET-01: The cash ticket shall contain the information below, in order from top to bottom and/or left to right. Non-required data should be printed after the required information. The ticket needs to be formatted depending on the printer type.

Impact printer and thermal printer without fan fold paper

(name of licensed establishment)

(name of city, town, or county)

Title

Validation Number Bar Code (Interleaved 2 of 5 format, representing the SAS validation number (subject to printer limitations, truncate MS, where applicable))

SAS Validation Number (use SAS Standard Validation ID# w/o connection to a Tier1 Host)

VGMID # (Video Gambling Machine Identification Decal #)(6 digits)

SERIAL # (machine serial number)

TIME (hr:min) (24 hr format) D or S (depending on Standard or Daylight Time)

DATE (month/day/year)

PROGRAM # (program name) (6 alphanumeric characters)

VIDEO # (video program name and revision if applicable)

SOUND # (sound program name and revision if applicable)

(prize value in numbers)

(prize value in words)

(sequence ticket number) (resets only when lifetime meters are cleared)

“Ticket Void After 48 hours”

Thermal printer with fan fold paper (See GSA SAS 6 Frequently Asked Questions Appendix A where applicable for specifications.)

(name of licensed establishment)

(name of city, town, or county)

Title

Validation Number Bar Code (Interleaved 2 of 5 format)

SAS Validation Number (use SAS Standard Validation ID# w/o connection to a Tier1 Host)

PROGRAM # (program name) (6 alphanumeric characters)

VIDEO # (video program name and revision if applicable)

SOUND # (sound program name and revision if applicable)

SERIAL # (machine serial number)

DATE (month/day/year)

TIME (hr:min) (24 hr format) D or S (depending on Standard or Daylight Time)

(sequence ticket number) (resets only when lifetime meters are cleared)

(prize value in words)

(prize value in numbers)

“Ticket Void After 48 hours”

VGMID # (Video Gambling Machine Identification Decal #)(6 digits)

REQ-VGM-CASHTICKET-02: The cash ticket shall print immediately upon initiating a cash out and not after the credits are mechanically accounted for or any other delay.

REQ-VGM-CASHTICKET-03: The cash ticket shall be printed for player credit amount.

REQ-VGM-CASHTICKET-04: The cash ticket sequence number shall be cleared if a lifetime memory operation is performed.

4.20 Multi-Denomination & Multi-Game Requirements

REQ-VGM-MULTI-01: The VGM shall have electronic 10 digit “cents played” and “cents won” meters for each game and for each denomination that has a distinct payable.

REQ-VGM-MULTI-02: The VGM shall include game-specific meters on the audit key, before and after lifetime memory clear, and before and after progressive change audit tickets with labels indicating each unique game, regardless of whether the game is enabled / disabled.

REQ-VGM-MULTI-03: The VGM shall notify the player of any remaining credit when the lowest denomination of a game exceeds the remaining amount in the player’s bank.

REQ-VGM-MULTI-04: The VGM shall disable help for a game if it is disabled.

REQ-VGM-MULTI-05: A multi-game VGM must always offer two of the following game types: video poker, video keno, video bingo, or video line games.

4.21 Progressive Requirements

REQ-VGM-PROGRESSIVE-01: The VGM shall have electronic 10 digit “jackpot” and “escrow” meters for each progressive jackpot capable of being cleared and programmed through the operators menu. Progressive meters shall be input in increments of the lowest denomination supported by their corresponding game. All progressive definitions are included in Appendix E.

REQ-VGM-PROGRESSIVE-02: The escrow meter shall increment when the total jackpot amount has increased past its maximum value; it shall also decrement after the jackpot has been won, adding to the player contribution amount in the jackpot electronic meter.

REQ-VGM-PROGRESSIVE-03: The jackpot and escrow meters and progressive jackpot logs shall be cleared when a lifetime memory clear operation is performed.

REQ-VGM-PROGRESSIVE-04: The VGM shall print all progressive meters for all games and progressive jackpot logs on the audit key and lifetime memory clear audit tickets. The progressive jackpot logs shall contain the time (hours and minutes), date, distinct jackpot name and jackpot amount and escrow meter from each distinct progressive jackpot awarded. The VGM shall print a maximum of five logs for the most recent progressive jackpot awarded.

REQ-VGM-PROGRESSIVE-05: The VGM shall print “Before Jackpot Change” and “After Jackpot Change” anytime the jackpot and escrow meters are adjusted. Tickets shall include the time, date, and their respective current jackpot, escrow and base amount for each distinct progressive.

REQ-VGM-PROGRESSIVE-06: The progressive base amount shall have a minimum value that it cannot be adjusted below.

REQ-VGM-PROGRESSIVE-07: The VGM shall not display progressive information in the help screen if that particular progressive jackpot is not available to the player.

REQ-VGM-PROGRESSIVE-08: The VGM shall not allow a progressive escrow meter to be set or changed unless the jackpot meter is at its max value.

REQ-VGM-PROGRESSIVE-09: The VGM shall not allow the progressive contribution percentage or any other progressive-growth related parameter to be adjusted by the operator.

REQ-VGM-PROGRESSIVE-10: If the entire progressive jackpot amount cannot be awarded due to a combination with another win (base payable pay, bonus, etc ...) which reaches the max win for a game, the progressive base and any other wins shall be awarded before deducting from the player contribution amount. The VGM shall use the following algorithm in calculating the new value of the progressive jackpot: if the progressive base plus any other wins are less than the maximum win, then the new progressive jackpot will be the previous progressive jackpot amount minus the smaller of either of the following: the amount contributed to the progressive by the player, or the maximum win minus the other wins and the progressive base. Otherwise, the new progressive jackpot will be equal to the previous progressive jackpot amount. Below is the same algorithm in pseudocode:

```
// award from progressive base and other wins before player contribution
if (base + other_wins < max_win)
{
    // calculate how much player has added to the jackpot through game play
    contribution = previous_jackpot - base;

    // calculate amount of contribution that can be awarded and reduce it accordingly
    new_jackpot = previous_jackpot - min(contribution, max_win - other_wins - base);
}
else
{
    // only the base and other wins could be awarded, so player contribution remains
    new_jackpot = previous_jackpot;
}
```

4.22 Linked Progressive Requirements

REQ-VGM-LINKPROGRESSIVE-01: VGMs linked together for the purpose of shared progressives shall use a master/slave model of communication.

REQ-VGM-LINKPROGRESSIVE-02: The master VGM shall store all progressive jackpots, escrows, and base amounts.

REQ-VGM-LINKPROGRESSIVE-03: Any slave VGM's linked progressive game shall become disabled if communication is lost with the master VGM and allow cash out of all player credits.

REQ-VGM-LINKPROGRESSIVE-04: The master VGM shall uniquely identify each slave VGM using a programmable ID set from the operators menu of the slave VGM.

REQ-VGM-LINKPROGRESSIVE-05: All linked VGMs shall report a link error if 2 or more master VGMs are in the same link.

REQ-VGM-LINKPROGRESSIVE-06: All linked VGMs shall report a link error if 2 or more slaves VGMs have the same ID.

REQ-VGM-LINKPROGRESSIVE-07: All slave VGMs shall not allow the adjustment for progressive jackpots, escrows, or base amounts.

REQ-VGM-LINKPROGRESSIVE-08: The jackpot logs shall be recorded on the VGM in which the jackpot was hit.

REQ-VGM-LINKPROGRESSIVE-09: The master VGM shall display the word “master” on the game selection menu if it is connected to and communicating with one or more slaves. The VGM shall not display the word “master” if no slaves are connected even if the VGM is configured to be master.

4.23 SAS Requirements

REQ-VGM-SAS-01: The VGM shall incorporate a female (no pins) RS232 DB9 connector implementing the standard pin out as defined by the EIA-232 standard. The cable shall be of sufficient length to easily reach a system interface board mounting regardless of the orientation of an interface board.

REQ-VGM-SAS-02: The VGM shall implement SAS the Logical Interface, including Wakeup Mode, as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SAS-03: The VGM shall implement the SAS Gaming Machine Addressing as defined in the GSA SAS Protocol Version 6.00 or later. The VGM shall support an attendant configurable address with a range of 1 to 127. An address of 0 may also be supported but is not required. When configured with an address of 0, the gaming machine ignores all communications from the host.

REQ-VGM-SAS-04: The VGM shall implement SAS timing requirements for Gaming Machine Response Time as defined in the GSA SAS Protocol Version 6.00 or later. An automated timing test tool can be provided from the GCD upon request.

REQ-VGM-SAS-05: The VGM shall implement SAS timing requirements for Inter-Byte Delay Time as defined in the GSA SAS Protocol Version 6.00 or later. An automated timing test tool can be provided from the GCD upon request.

REQ-VGM-SAS-06: The VGM shall support SAS error condition Loop Break Indication as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SAS-07: The VGM shall use standard validation as its default configuration.

REQ-VGM-SAS-08: The VGM shall support selecting between Standard Validation or Enhanced Validation via an operators menu.

REQ-VGM-SAS-09: The VGM shall halt and prevent game play if it is configured to Enhanced Validation with no Validation ID configured from the host.

REQ-VGM-SAS-10: The VGM shall halt and prevent game play when it is configured to Enhanced Validation and the validation buffer becomes full of unread records. The VGM shall continue game play if a link down condition occurs and the validation buffer is not full. The VGM shall never go into a hand pay state.

REQ-VGM-SAS-11: All VGM-reported electronic meters shall balance using the formula:
 $$$IN + $$WN = $$PL + $$PD + $$CR$
An automated meter test tool can be provided from the GCD upon request.

REQ-VGM-SAS-12: Upon a master reset VGM shall prompt for SAS configuration. If SAS is activated, force the operator to select the SAS address and validation type.

4.24 SAS General Poll Exception Requirements

REQ-VGM-SASEXCEPTION-01: The VGM shall implement SAS general poll exception FIFO and priority as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASEXCEPTION-02: The VGM shall support SAS general poll exception 00 (No Activity) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASEXCEPTION-03: The VGM shall support SAS general poll exception 11 (Slot Door Opened) as defined in the GSA SAS Protocol Version 6.00 or later. This exception is specified as “Main Area Door Opened” for Montana implementation.

REQ-VGM-SASEXCEPTION-04: The VGM shall support SAS general poll exception 12 (Slot Door Closed) as defined in the GSA SAS Protocol Version 6.00 or later. This exception is specified as “Main Area Door Closed” for Montana implementation.

REQ-VGM-SASEXCEPTION-05: The VGM shall support SAS general poll exception 13 (Drop Door Opened) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASEXCEPTION-06: The VGM shall support SAS general poll exception 14 (Drop Door Closed) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASEXCEPTION-07: The VGM shall support SAS general poll exception 15 (Card Cage Opened) as defined in the GSA SAS Protocol Version 6.00 or later. This exception is specified as “Logic Door Opened” for Montana implementation.

REQ-VGM-SASEXCEPTION-08: The VGM shall support SAS general poll exception 16 (Card Cage Closed) as defined in the GSA SAS Protocol Version 6.00 or later. This exception is specified as “Logic Door Closed” for Montana implementation.

REQ-VGM-SASEXCEPTION-09: The VGM shall support SAS general poll exception 17 (AC Power Applied) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASEXCEPTION-10: The VGM shall support SAS general poll exception 18 (AC Power Lost) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASEXCEPTION-11: The VGM shall support SAS general poll exception 19 (Cashbox Door Opened) as defined in the GSA SAS Protocol Version 6.00 or later. This exception is specified as “Cash Accessed Opened” for Montana implementation.

REQ-VGM-SASEXCEPTION-12: The VGM shall support SAS general poll exception 1A (Cashbox Door Closed) as defined in the GSA SAS Protocol Version 6.00 or later. This exception is specified as “Cash Accessed Closed” for Montana implementation.

REQ-VGM-SASEXCEPTION-13: The VGM shall support SAS general poll exception 1B (Cashbox Removed) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASEXCEPTION-14: The VGM shall support SAS general poll exception 1C (Cashbox Installed) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASEXCEPTION-15: The VGM shall support SAS general poll exception 1D (Belly Door Opened) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASEXCEPTION-16: The VGM shall support SAS general poll exception 1E (Belly Door Closed) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASEXCEPTION-17: The VGM shall support SAS general poll exception 27 (Cash Box Full) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASEXCEPTION-18: The VGM shall support SAS general poll exception 28 (Bill Jam) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASEXCEPTION-19: The VGM shall support SAS general poll exception 29 (Bill Acceptor Hardware Failure) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASEXCEPTION-20: The VGM shall support SAS general poll exception 2B (Bill Rejected) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASEXCEPTION-21: The VGM shall support SAS general poll exception 3C (Operator Changed Options) as defined in the GSA SAS Protocol Version 6.00 or later. This exception shall be sent whenever an operator changes configuration options. That includes denomination, gaming machine address, or any option that affects the response to long polls 1F (Send Gaming Machine ID and Information), 53 (Send Game N Configuration), 54 (Send SAS Version ID and Gaming Machine Serial Number), and 56 (Send Enabled Game Numbers), A0 (Send Enabled Features).

REQ-VGM-SASEXCEPTION-22: The VGM shall support SAS general poll exception 3D (Cash Out Ticket Printed) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASEXCEPTION-23: The VGM shall support SAS general poll exception 3F (Validation ID Not Configured) as defined in the GSA SAS Protocol Version 6.00 or later. This exception is of type “Priority” and shall be placed at the head of the exception queue when it occurs. See *REQ-VGM-SAS-09* for VGM behavior requirements while this exception is being reported.

REQ-VGM-SASEXCEPTION-24: The VGM shall support SAS general poll exception 47 (\$1.00 Bill Accepted) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASEXCEPTION-25: The VGM shall support SAS general poll exception 48 (\$5.00 Bill Accepted) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASEXCEPTION-26: The VGM shall support SAS general poll exception 49 (\$10.00 Bill Accepted) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASEXCEPTION-27: The VGM shall support SAS general poll exception 4A (\$20.00 Bill Accepted) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASEXCEPTION-28: The VGM shall support SAS general poll exception 60 (Printer Communication Error) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASEXCEPTION-29: The VGM shall support SAS general poll exception 61 (Printer Paper Out Error) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASEXCEPTION-30: The VGM shall support SAS general poll exception 70 (Exception Buffer Overflow) as defined in the GSA SAS Protocol Version 6.00 or later. This exception is of type “Priority” and should be reported at the next opportunity.

REQ-VGM-SASEXCEPTION-31: The VGM shall support SAS general poll exception 7A (Game Soft Meter Reset to Zero) as defined in the GSA SAS Protocol Version 6.00 or later. This exception is reported only when “Lifetime Meters” are cleared for Montana implementation. 7A must be sent directly after meters are zeroed.

REQ-VGM-SASEXCEPTION-32: The VGM shall support SAS general poll exception 86 (Gaming Machine is Out of Service) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASEXCEPTION-33: The VGM shall support SAS general poll exception 8C (Game Selected) as defined in the GSA SAS Protocol Version 6.00 or later.

4.25 SAS Long Poll Command Requirements

REQ-VGM-SASLONGPOLL-01: The VGM shall support SAS long poll 21 (ROM Signature Verification) as defined in the GSA SAS Protocol Version 6.00 or later. The VGM shall include all critical data in its CRC calculation for SAS long poll 21 including the BIOS, extended BIOS, MBR, OS partitions, game partitions, and paytables. If a chain of trust is used in the boot process of the VGM, the calculation may be performed on the start of the chain that contains the next link’s signature omitting the rest of the boot chain from the CRC calculation. Graphics may be omitted from the CRC calculation. The CRC reported by SAS long poll 21 shall be externally calculated outside of the VGM on the game media and will match exactly.

REQ-VGM-SASLONGPOLL-02: The VGM shall support SAS long poll 0F (Send Meters 10 through 15) as defined in the GSA SAS Protocol Version 6.00 or later. The VGM shall use the Meter Cross Reference table in Appendix D of this document. The Total Jackpot meter is defined as “the cumulative sum of all credits paid by an attendant, as a result of winning wagers and awards from an external bonusing system” and shall always have a zero value for MT.

REQ-VGM-SASLONGPOLL-03: The VGM shall support SAS long poll 10 (Send Total Cancelled Credits Meter) as defined in the GSA SAS Protocol Version 6.00 or later. The VGM shall use the MT meter cross reference table in Appendix D of this document.

REQ-VGM-SASLONGPOLL-04: The VGM shall support SAS long poll 11 (Send Total Coin In Meter) as defined in the GSA SAS Protocol Version 6.00 or later. The VGM shall use the MT meter cross reference table in Appendix D of this document.

REQ-VGM-SASLONGPOLL-05: The VGM shall support SAS long poll 12 (Send Total Coin Out Meter) as defined in the GSA SAS Protocol Version 6.00 or later. The VGM shall use the MT meter cross reference table in Appendix D of this document.

REQ-VGM-SASLONGPOLL-06: The VGM shall support SAS long poll 13 (Send Total Drop Meter) as defined in the GSA SAS Protocol Version 6.00 or later. The VGM shall use the MT meter cross reference table in Appendix D of this document.

REQ-VGM-SASLONGPOLL-07: The VGM shall support SAS long poll 15 (Send Games Played Meter) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASLONGPOLL-08: The VGM shall support SAS long poll 16 (Send Games Won Meter) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASLONGPOLL-09: The VGM shall support SAS long poll 17 (Send Games Lost Meter) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASLONGPOLL-10: The VGM shall support SAS long poll 18 (Send Games Since Last Power Up and Games Since Last Slot Door Closure Meters) as defined in the GSA SAS Protocol Version 6.00 or later. The “Slot Door” is defined as the “Main Door” for Montana implementation.

REQ-VGM-SASLONGPOLL-11: The VGM shall support SAS long poll 19 (Send Games Meters 11 through 15) as defined in the GSA SAS Protocol Version 6.00 or later. The VGM shall use the MT meter cross reference table in Appendix D of this document. The Total Jackpot meter is defined as “the cumulative sum of all credits paid by an attendant, as a result of winning wagers and awards from an external bonusing system” and shall always have a zero value for MT.

REQ-VGM-SASLONGPOLL-12: The VGM shall support SAS long poll 1A (Send Current Credits Meter) as defined in the GSA SAS Protocol Version 6.00 or later. One credit is defined as \$.01 for Montana implementation.

REQ-VGM-SASLONGPOLL-13: The VGM shall support SAS long poll 1E (Send Total Bill Meters) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASLONGPOLL-14: The VGM shall support SAS long poll 1F (Send Gaming Machine ID and Information) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASLONGPOLL-15: The VGM shall support SAS long poll 20 (Send Total Dollar Value of Bills Meter) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASLONGPOLL-16: The VGM shall support SAS long poll 31 (Send \$1.00 Bills In Meter) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASLONGPOLL-17: The VGM shall support SAS long poll 32 (Send \$2.00 Bills In Meter) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASLONGPOLL-18: The VGM shall support SAS long poll 33 (Send \$5.00 Bills In Meter) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASLONGPOLL-19: The VGM shall support SAS long poll 34 (Send \$10.00 Bills In Meter) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASLONGPOLL-20: The VGM shall support SAS long poll 35 (Send \$20.00 Bills In Meter) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASLONGPOLL-21: The VGM shall support SAS long poll 36 (Send \$50.00 Bills In Meter) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASLONGPOLL-22: The VGM shall support SAS long poll 37 (Send \$100.00 Bills In Meter) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASLONGPOLL-23: The VGM shall support SAS long poll 46 (Send Credit Amount of All Bills Accepted) as defined in the GSA SAS Protocol Version 6.00 or later. One credit is defined as \$.01 for Montana implementation.

REQ-VGM-SASLONGPOLL-24: The VGM shall support SAS long poll 48 (Send Last Accepted Bill Information) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASLONGPOLL-25: The VGM shall support SAS long poll 54 (Send SAS Version ID and Gaming Machine Serial Number) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASLONGPOLL-26: The VGM shall support SAS long poll 7E (Send Current Date and Time) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASLONGPOLL-27: The VGM shall support SAS long poll A0 (Send Enabled Features) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASLONGPOLL-28: The VGM shall support SAS long poll 2F (Send Selected Meters for Game N) as defined in the GSA SAS Protocol Version 6.00 or later for meters 00 (Total Coin In Credits) and 01 (Total Coin Out Credits). The VGM shall use the MT meter cross reference table in Appendix D of this document.

REQ-VGM-SASLONGPOLL-29: The VGM shall support SAS long poll 51 (Send Total Number of Games Implemented) as defined in the GSA SAS Protocol Version 6.00 or later. The VGM shall include Global Bonus Games in this total games count if they exist.

REQ-VGM-SASLONGPOLL-30: The VGM shall support SAS long poll 52 (Send Game N Meters) as defined in the GSA SAS Protocol Version 6.00 or later. The VGM shall use the MT meter cross reference table in Appendix D of this document. The Total Jackpot meter is defined as “the cumulative sum of all credits paid by an attendant, as a result of winning wagers and awards from an external bonusing system” and shall always have a zero value for MT.

REQ-VGM-SASLONGPOLL-31: The VGM shall support SAS long poll 53 (Send Game N Configuration) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASLONGPOLL-32: The VGM shall support SAS long poll 55 (Send Selected Game Number) as defined in the GSA SAS Protocol Version 6.00 or later. The VGM shall give Global Bonus Games a unique ID number if they exist.

REQ-VGM-SASLONGPOLL-33: The VGM shall support SAS long poll 56 (Send Enabled Game Numbers) as defined in the GSA SAS Protocol Version 6.00 or later. The VGM shall give Global Bonus Games a unique ID number if they exist.

REQ-VGM-SASLONGPOLL-34: The VGM shall support SAS long poll 4C (Set Enhanced Validation ID) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-VGM-SASLONGPOLL-35: The VGM shall support SAS long poll 4D (Send Enhanced Validation Information) as defined in the GSA SAS Protocol Version 6.00 or later for Validation Type “00” (Cashable Ticket). The response Sequential ticket number (Byte 25-26) shall be reported in binary format with the LSB in Byte 25 per the GSA SAS Protocol Version 6.00 or later. For example, if ticket “0009” was printed the response to 4D would contain “0900” since LSB comes first with binary format.

REQ-VGM-SASLONGPOLL-36: The VGM shall support SAS long poll 3D (Send Cash Out Ticket Information) as defined in the GSA SAS Protocol Version 6.00 or later. The VGM shall only report the least significant 4 bytes if the standard validation number calculated by the VGM is larger than 4 bytes in size.

REQ-VGM-SASLONGPOLL-37: The VGM shall support SAS long poll 50 (Send Validation Meters) as defined in the GSA SAS Protocol Version 6.00 or later for Validation Type “00” (Cashable Ticket).

REQ-VGM-SASLONGPOLL-38: The VGM shall support SAS long poll 6F (Send Extended Meters) as defined in the GSA SAS Protocol Version 6.00 or later for the meters identified in Appendix D. All required meters must support a minimum length of 5 BCD.

REQ-VGM-SASLONGPOLL-39 The VGM shall support SAS long poll 7B (Extended Validation Status) as defined in the GSA SAS Protocol Version 6.00 or later for the MT VGMID identified in Appendix D.

REQ-VGM-SASLONGPOLL-40 The VGM shall support long poll 7F (Receive Date and Time) as defined in the GSA SAS Protocol Version 6.00 or later.

4.26 Software Source Code Requirements

REQ-VGM-SOURCE-01: The VGM’s source code shall produce the exact same binary image every time it is built regardless of the build machine, location, time, etc. Minor differences may be permitted but all differences must be fully documented and externally verifiable. This requirement should be a deciding factor when choosing the OS platform and/or build environment. The technical services lab needs the ability to build the VGM production image from source and match it to the submitted binary to ensure the correct source was analyzed and archived.

REQ-VGM-SOURCE-02: The VGM’s source code shall not contain source that is not compiled into the production image. Examples of this would be source code used for test purposes only, source used in other jurisdictions, or new features that are not yet enabled.

REQ-VGM-SOURCE-03: The VGM’s source code shall not contain files that are named the same but have different case in the same directory. This causes problems during source analysis on case insensitive platforms like Windows.

REQ-VGM-SOURCE-04: The VGM’s source code shall not contain version specific strings in the file or directory names. This causes issues during the diffing of two versions of source code.

REQ-VGM-SOURCE-05: The VGM’s source code build environment shall be reproducible and documented.

REQ-VGM-SOURCE-06: The VGM’s shall support a debugging or emulation capability either through software (GDB, Visual Studios, etc ...) or hardware debugging (JTAG interface). This debugging capability shall aid testing via forced outcomes as well as allow the game to be stopped and all random pool numbers displayed before they are displayed to the VGM screen. If software debugging is supported in the production software, the VGM shall require a separate piece of hardware (EPROM, CF, etc ...) that enables the debugging functionality for security purposes.

REQ-VGM-SOURCE-07: The VGM shall implement a chain of trust in the boot process where the BIOS that reside on a programmable read-only memory device is the chain anchor. The chain is established by validating each component of hardware and software from the bottom up before execution control is given to that component. A typical chain of trust may start with a BIOS that contains the signature of a Compact Flash card the VGM control software resides on. The BIOS validates the signature of the Compact Flash card before handing execution control to it and booting the game machine. If an error occurs, the VGM is halted.

4.27 Video Line Game Requirements

REQ-VGM-LINE-01: The video line game shall have a minimum 80% return. Games containing a progressive shall use the base progressive amounts when computing the minimum return.

REQ-VGM-LINE-02: The video line game shall have a maximum award of \$800 including any combined award from a bonus game(s).

REQ-VGM-LINE-03: The video line game shall have a maximum bet of \$2 per game.

REQ-VGM-LINE-04: The video line game generates numbers using a random number generator and displays symbol(s) using a one to one correspondence to the logical stop selections for each reel.

REQ-VGM-LINE-05: The video line game shall not have a theoretical return greater than 92% for each bet increment. A qualified independent testing service must supply detailed written verification.

REQ-VGM-LINE-06: The video line game shall draw and display a minimum of three numbers or symbols in a line.

REQ-VGM-LINE-07: The video line game shall clearly identify each individual line that is brought into play by wagering additional money when more than one line is played.

REQ-VGM-LINE-08: Displays and identifies each winning combination of numbers or symbols and the amount won.

REQ-VGM-LINE-09: The movement of numbers or symbols shall stop automatically or the player may manually stop the movement prior to the automatic stop.

REQ-VGM-LINE-10: Winning combination(s) must form a vertical, horizontal, or diagonal line or other specified shapes that may include: matching numbers or symbols or particular numbers or symbols that appear in any sequence or position.

4.28 Validation

REQ-VGM-VAL-01: The VGM shall incorporate a RS232 DB9 connector implementing the standard pin out as defined by the EIA-232 standard. The connector shall be easily accessible, and shall be identified as "GAT" through clear physical or software labeling and reside in a locked area of the VGM. With GAT enabled on the VGM, the connector shall be dedicated solely for GAT communication.

REQ-VGM-VAL-02: VGM shall incorporate GAT (Gaming Authentication Terminal) version 3.5 or later for verifying all critical program components. A GAT test tool can be provided from the GCD upon request. Refer to the Gaming Standards web site for protocol specifications:
gamingstandards.com.

REQ-VGM-VAL-02.2: GAT shall be available at all times without requiring a Master Reset. Operator menu selection to enable a GAT port is considered to meet this requirement.

REQ-VGM-VAL-03: The VGM shall send the file *ProgramID.xml* in response to the GAT3 request “Get File ProgramID.xml”. *ProgramID.xml* will be of the following form, where XXXXXX is the Program Name of the VGM:

```
<?xml version="1.0"?>
<ProgramID>
  <Value>XXXXXX</Value>
</ProgramID>
```

Refer to GSA GAT Protocol section 4.2.2 for “Special Function: Get File filename.xml”.

REQ-VGM-VAL-04: The VGM shall complete the GAT authentication process within 10 minutes testing, at a minimum, all critical program components.

Appendix A: Glossary

Operators Menu – Screen accessed via key that allows operator customizations and settings. This may also be known as the back office.

Programmable Read-Only Memory – Includes PROMs, OTP NVMs, EPROMs, OTP EPROMs, EEPROMs and any other form of read-only memory that is programmed onto a physical read-only chip.

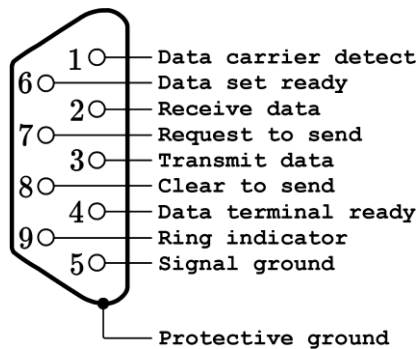
GAT – Game Authentication Terminal as defined by the Gaming Standards Association.

Global Bonus – A global bonus is a single bonus game (not Poker, Keno, Bingo, or a Line Game) that can be achieved from play of more than one game title.

RAM – Random Access Memory.

RNG – Random Number Generator.

RS232 DB9 –



SAS – Slot Accounting System; developed by IGT.

UUT – Unit Under Test.

VGM – Video Gambling Machine.

VGMID – Video Gambling Machine Identification; this tag is supplied by GCD and is affixed to every VGM in the field. Common locations for this tag on a VGM (subject to cabinet design) are adjacent to the serial tag and/or on the upper-right side of a non-removable portion of the exterior.

Appendix B: Static Test Procedure

EQUIPMENT USED:

- 1) High Frequency Generator (HFG), Electro Technic Product m/n BD10AS (operating frequency approximately 500 kHz)
- 2) Peak Voltage Calibrator (PVC), Electro Technic Product m/n 1240
- 3) Spring Electrode Tip, Electro Technic Product m/n 1211
- 4) Properly grounded wall outlet

TEST PROCEDURE:

- 1) Calibrate the HFG for a maximum voltage output of 40,000 volts by performing the following steps:
 - a) Turn off power to the HFG.
 - b) Remove the spring electrode tip from the HFG.
 - c) Insert the fixed electrode shaft of the PVC into the electrode socket of the HFG.
 - d) Attach the PVC alligator clip lead to earth ground.
 - e) Turn the HFG voltage knob counter clockwise until seated.
 - f) Adjust the PVC to 40,000 volts.
 - g) Apply power to the HFG and slowly turn the voltage knob on the HFG clockwise until a static arc jumps the gap between the electrodes inside the PVC.
 - h) Unplug the HFG, remove the PVC and install the spring electrode tip.
- 2) Power up the unit under test (UUT) using a properly grounded wall outlet and insure proper operation.
- 3) Plug the HFG into a properly grounded wall outlet.
- 4) Apply the output of the HFG to the entire exterior of the UUT. Approximately every square inch of the device should be covered, top and all sides. The HFG should be in motion at all times. This test should take approximately 3 minutes for a standard upright gambling device. If any machine failure is detected when a certain area is induced with static, that area should be induced again. The HFG should be held the maximum distance from the UUT while still producing a static arc.
- 5) When the game data before the test is 100% identical to the game data after the test, the UUT is determined to have passed the test.

Appendix C: RNG Test

The test program must have an option to send the minimum and maximum number of numbers that may be generated for each individual game type (poker, keno and bingo). Alternate communications protocols may be considered but must first be discussed with the Gambling Control Technical Services Lab. A sample program used to gather the RNG data can be obtained from Gambling Control TSS upon request.

COMMUNICATIONS PROTOCOL:

- 1) RS232 asynchronous communication
- 2) DB9 cable (minimum length 6 feet)
- 3) 115200 baud
- 4) No parity
- 5) 8 data bits
- 6) 1 stop bit

PROCEDURE:

- 1) Look for ASCII letter "R" (ready) via RS232 connection.
- 2) When "R" is read:
 - a) Poker
 - i) Using the Random Number Generator, generate the game numbers.
 - ii) Send ASCII representations of the 10 cards to the PC via RS232 connection, using the "Defined Data Format."
 - b) Keno
 - i) Using the Random Number Generator, generate the game numbers.
 - ii) Send ASCII representations of the 20 numbers to the PC via RS232 connection using the "Defined Data Format."
 - c) Bingo
 - i) Using the Random Number Generator, generate the game numbers. There will be 2 separate tests: the first for the 75 game numbers and second for the 15 numbers for each column on the Bingo card.
 - ii) For the first test, send ASCII representations of the 75 numbers to the PC via RS232 connection, using the "Defined Data Format."
 - iii) For the second test, send ASCII representations of the numbers for each column to the PC via RS232 connection, using the "Defined Data Format."
 - d) Line
 - i) Using the Random Number Generator, generate the game numbers. The VGM must have an option to play all possible reels and stops.
 - ii) For x number of reels, send ASCII representations of the x reels to the PC via RS232 connection, using the "Defined Data Format."
- 3) Defined Data Format:
 - a) Poker
 - i) Each RNG value must be 2 digits in length.
 - ii) All values must be consecutive and between "00" and "51" or "01" and "52" for poker w/o a joker, "00" and "52" or "01" and "53" for poker utilizing 1 joker, and "00" and "53" or "01" and "54" for poker utilizing 2 jokers.
 - iii) Send 1 ASCII "space" between each 2-digit value; do not send anything after the last two digit value (this includes spaces, line feeds and carriage returns).
 - iv) A total of 29 ASCII characters should be sent to the PC for each game of poker played.

- b) Keno
 - i) Each RNG value must be 2 digits in length.
 - ii) All values must be consecutive and between “00” and “79” or “01” and “80”.
 - iii) Send 1 ASCII “space” between each 2-digit value; do not send anything after the last two digit value (this includes spaces, line feeds and carriage returns).
 - iv) A total of 59 ASCII characters should be sent to the PC for each game of keno played.
 - c) Bingo
 - i) Game Numbers
 - a. Each RNG value must be 2 digits in length.
 - b. All values must be consecutive and between “00” and “74” or “01” and “75”.
 - c. Send 1 ASCII “space” between each 2 digit value; do not send anything after the last two digit value (this includes spaces, line feeds and carriage returns).
 - d. A total of 224 ASCII characters should be sent to the PC for each game of bingo played.
 - ii) Bingo Card Numbers
 - a. Each value must be 2 digits in length.
 - b. All numbers must be consecutive and between:
 - “01” and “14” or “01” and “15” for the B column,
 - “15” and “29” or “16” and “30” for the I column,
 - “30” and “44” or “31” and “45” for the N column,
 - “45” and “59” or “46” and “69” for the G column, and
 - “60” and “74” or “61” and “75” for the O column.
 5 numbers are generated for each column, with the exception of the “N” column, which will be 4 numbers.
 - c. Send 1 ASCII “space” between each 2 digit value; do not send an ASCII “space” following the last 2 digit value in the “O” column (this includes spaces, line feeds and carriage returns).
 - d. A total of 71 ASCII characters should be sent to the PC for each complete Bingo Card for which the numbers are generated.
 - d) Line
 - i) Each RNG value must be 2 digits in length.
 - ii) For an n -stop reel, the values chosen by the RNG must be consecutive and between either “00” and $(n - 1)$ or “01” and n .
 - iii) Send 1 ASCII “space” between each 2-digit value; do not send anything after the last two digit value (this includes spaces, line feeds and carriage returns).

EXAMPLE: A total of 14 ASCII characters should be sent to the PC for a 5 reel line game.
- 4) Revert to the “game over” state and wait for the next “R”.

Appendix D: SAS to MT Cross Reference

Meter Cross Reference

SAS Meter Label	SAS Long Poll Command	SAS Meter Code Value	Montana Meter Label	Montana Meter Name
Total Coin In	6F	0000	\$\$PL	Money Played
Total Coin Out	6F	0001	\$\$WN	Money Won
Total Canceled Credits	6F	0004	\$\$PD	Money Paid
Total Drop	6F	0024	\$\$IN	Money In
Current Credits	6F	000C	\$\$CR	Current Credits

One credit is defined as \$0.01 for Montana implementation.

SAS Gaming Machine Asset Number / House ID to VG MID Cross Reference

SAS Label	SAS Long Poll Command	Montana Label
Gaming Machine Asset Number / House ID	7B	VG MID

Appendix E: Progressive Definitions

Progressive / Jackpot – This is the combination of Contributed Jackpot plus the Base Jackpot Amounts, minus the Escrow Amount. This is displayed on audit tickets and to the player.

Player Contribution / Contributed Jackpot Amount – This is the amount of the progressive that is contributed entirely through game play, whether through placing bets or achieving wins.

Base Jackpot Amount – This is the amount of the progressive that is always awarded when that progressive is achieved, with consideration given to capping for a single game.

Escrow Amount – This is the amount of the progressive that is left over when subtracting the max win of \$800 from the Contributed Jackpot plus the Base Jackpot Amounts. The Escrow is zero when the Contributed Jackpot plus the Base Jackpot Amount is \$800 or less.